

### REMARKS

Claims 1-3, 6-9, 11-12, 14, 16-20, and 33-40 were pending. Claims 1-2, 6-9, 12, 14, 16-19, 33-36, and 38-40 have been amended. Claims 41-50 have been added. Claims 1-3, 6-9, 11-12, 14, 16-20, and 33-50 are pending.

Claim 3 stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Applicant respectfully disagrees and notes that step 220, the post-mold curing step, follows the step 215 mold process. See FIG. 7 and the description at lines 6-12 on page 8 of the specification. Applicant urges withdrawal of the rejection under 35 U.S.C. § 112, first paragraph.

Claim 38 stands rejected under 35 U.S.C. § 112, second paragraph, based on indefiniteness. Claim 38 has been amended to address this concern. Claim 38 particularly points out and distinctly claims the subject matter of the invention.

Claims 1-3, 9, 11-12, 14, 19-20, 33, 35, and 37-40 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,232,661 to Amagai et al. Reconsideration of this rejection is respectfully requested.

Claim 1 recites a semiconductor device assembly comprising, *inter alia*, "a layer comprising at least one partially-cured adhesive" adhering a die to a solder mask. The partially-cured adhesive comprises "one or more adhesive components that can cure at or below 100°C."

Amagai et al. discloses a semiconductor device in which a die is secured to a solder mask with a laminated adhesive tape. The adhesive tape includes an intermediate member with an adhesive applied to both sides. Amagai et al. does not teach or suggest a semiconductor device having "a layer comprising at least one partially-cured adhesive" adhering a die to a solder mask.

The rejection based on Amagai et al. appears to be based on an improper interpretation of the recitation “partially-cured adhesive components that can cure at or below 100°C.” The improper interpretation is based on an incorrect determination that process limitations are contained in claim 1. The rejection also relies on an unsupported determination that “adhesive is completely solid.” See footnote 2 on page 4 of the Office Action. Applicant respectfully disagrees: “partially-cured” is not a “process limitation” and the claimed “partially-cured adhesive” is not “completely solid.”

More specifically, the product recited in claim 1 includes “a layer comprising at least one partially-cured adhesive.” The recited term “partially-cured” describes the structure of the claimed layer. No process steps are recited in claim 1. “Partially-cured” is not a process limitation, but instead describes the physical state of the adhesive and must be given weight in the device claim 1.

Further, applicant urges that there is no inconsistency in claim 1. The recitation of a “partially-cured adhesive comprising one or more adhesive components that can cure at a temperature above ambient and at or below 100°C” does not require that a solid adhesive component.

The product recited in claim 1 is not the same as the product disclosed by Amagai et al. The recited adhesive is in the state of “partially-cured,” which is different from the tape laminate disclosed in Amagai et al., for example. Amagai et al. does not teach or suggest “a layer comprising at least one partially-cured adhesive” adhering a die to a solder mask.<sup>1</sup>

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<sup>1</sup> The Office Action also states that the recitation in claims 9 and 19 of “initiators in the partially-cured adhesive which react at a temperature...” is a process limitation to be given no weight. Applicant notes, however, that the phrase “which react at a temperature” is physically descriptive of the initiators, and

Claim 1 is patentable over Amagai et al. Claims 2-3, 9, 11, 33, 37, and 39 depend directly or indirectly from claim 1 and are patentable over Amagai et al. for at least the same reasons.

Claim 12 recites a semiconductor device assembly that comprises, *inter alia*, "a layer comprising a partially-cured adhesive" affixing a die to a solder mask. The partially-cured adhesive contains "one or more adhesive components that have curing temperatures above ambient and at or below 100°C."

As noted above with respect to claim 1, Amagai et al. does not teach or suggest a "partially-cured adhesive." Consequently, Amagai et al. does not teach or suggest "a layer comprising a partially-cured adhesive" affixing a die to a solder mask. Claim 12 is patentable over Amagai et al. Claims 14, 19-20, 35, and 40 depend directly or indirectly from claim 12 and are patentable over Amagai et al. for at least the same reasons.

Claims 6-8, 16-18, 34, and 36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Amagai et al. in combination with U.S. Pat. No. 6,007,920 to Umehara et al. Reconsideration of this rejection is respectfully requested.

Claims 6-8 and 34 depend directly or indirectly from claim 1. Claim 1 is patentable over Amagai et al. as advanced above. Umehara et al. does not remedy the deficiencies of Amagai et al. Umehara et al. is cited for its disclosure of bismaleimide. Umehara et al. does not combine with Amagai et al. to provide a semiconductor device assembly having "a layer comprising at least one partially-cured adhesive" adhering a die to a solder mask.

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does not recite a process step. Further, the statement in footnote 3 on page 4 that the initiators are "no longer in the final product" is not well understood by applicant: Claims 9 and 19 recite device

Moreover, the proposed combination of Amagai et al. and Umehara et al. fails to establish *prima facie* obviousness for lack of the requisite motivation. The bismaleimide is used in Umehara et al. to secure substrate 6 to resin sheet 3. Nothing in Amagai et al. or Umehara et al. provides an incentive to modify Amagai et al. by using bismaleimide resin disclosed in Umehara et al. to replace the laminate tape adhesive as would be necessary to arrive at the invention recited in claim 1. In addition, significant features of the three-layer laminate tape adhesive disclosed by Amagai et al. would be lost if it were to be replaced with a bismaleimide resin, including the thickness of the laminate tape adhesive. See col. 6, lines 19-21, for example. Moreover, neither reference provides any suggestion of using the bismaleimide resin of Umehara et al. as a “partially-cured adhesive” in the embodiment recited in claim 1.

Claim 1 is patentable over the proposed combination of Amagai et al. and Umehara et al. Claims 6-8 and 34 depend from claim 1 and are patentable over Amagai et al. combined with Umehara et al. for at least the same reasons.

Claims 16-18 and 36 depend directly or indirectly from claim 12. Claim 12 is patentable over Amagai et al. as advanced above. Umehara et al. does not remedy the deficiencies of Amagai et al. As noted above with respect to claim 1, Umehara et al., cited for its disclosure of bismaleimide, does not combine with Amagai et al. to provide a semiconductor device assembly having “a layer comprising at least one partially-cured adhesive” affixing a die to a solder mask.

Claim 12 is patentable over the proposed combination of Amagai et al. and Umehara et al. Claims 16-18 and 36 depend from claim 1 and are patentable over Amagai et al. combined with Umehara et al. for at least the same reasons.

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embodiments that contain “initiators in the partially-cured adhesive.” The presence or absence of initiators in a final product is of no moment as an intermediate product is being claimed.

Claims 41-50 are new. Claims 41-45 depend directly or indirectly from claim 1. Claims 46-50 depend directly or indirectly from claim 12. Claims 1 and 12 are patentable over the cited references to Amagai et al. and Umehara et al. as advanced above. New claims 41-45 and 46-50 respectively are patentable over Amagai et al. and Umehara et al. for at least the same reasons.

In view of the above amendment and remarks, applicant believes the pending application is in condition for allowance.

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